# SERVPRO® ECTP WATER MANUAL
## *ANSWERS FOR REVIEW QUESTIONS*

## SAFETY REVIEW QUESTIONS

**1)**

1. The first item to check is the power distribution box. Turn off all circuit breakers at the power distribution panel.
2. Check if the water is inside wall cavities or electrical outlets, or when electrical outlets are located on the floor.
3. Determine the location of electrical wiring, cables and power lines before drilling or cutting into walls or other structural areas. (p. 7 and 8)

**2)**

Safety concerns must be taken seriously and properly addressed before starting emergency services and restoration work. (p. 3)

**3)**

- To stop contaminants from spreading into uncontaminated areas.
- To protect building occupants and workers from being exposed t contaminants.
- Manage airflow from clean to contaminated areas. (p.15)

**4)**

The appropriate personal protective equipment include:

- Respirator.
- Chemical resistant gloves.
- Rubber boots.
- Splash goggles.
- Full-body suits. (p. 13)

**5)**

An at-risk person is someone who is at-risk to get infected more easily than other people. At-risk people may include:

- the very young.
- the old.
- people with respiratory problems such as asthma or emphysema.
- people sensitive to chemicals such as disinfectants. (p. 13)

**6)**

Wastewater should be disposed in accordance with state or local guidelines.

Requirements differ from state to state and may even be different for various cities within a state. (p. 14)

**7)**

Typical confined spaces that workers must enter during water damage restoration jobs are crawl spaces and attics. (p. 6)

**8)**

Vacate pets and people from areas where disinfectants and deodorants are being applied. Before allowing occupants back in the area, ensure the area is properly ventilated and the product has had time to dry. (p. 17)

**9)**

Slips, trips, and falls. (p. 5)

**10)**

1. SERVPRO® (35026) Chemical Reference Manual.
2. SERVPRO® (35100) Production Guidelines. (p. 17)

# PSYCHOMETRY REVIEW QUESTIONS

**1)**

The specific humidity is 107.

**2)**

Take the readings for relative humidity and temperature from a thermohygrometer that is set in your office or outside.
Once you know the relative humidity and temperature, you find the specific humidity (grains per pound) using psychometric charts or calculators as follows:

- Find the vertical line that represents the current temperature of the air.
- Find the curve line that represents the current relative humidity of the air.
- Find the intersection of curve and vertical line.
- Trace the horizontal line from the intersection point to the columns of numbers on the right side of the chart. The first column of numbers indicates the specific humidity (the grains per pound). (p. 27 and 28)

**3)**

It means the following:

- Wet goes to Dry.
- Hot goes to Cold.
- High Pressure goes to Low Pressure. (p. 33)

**4)**

Primary damage occurs when materials come into direct contact with water. Secondary damage occurs when materials are damage by water vapor. (p. 32)

**5)**

The equilibrium moisture content (EMC) will be lost if there is more water in the air. The moisture content is not stabilized in relation to the relative humidity and temperature anymore. (p. 34)

**6)**

When drying a structure, you must never let the inside temperature to reach the dew point or else water vapor will return to a liquid on inside surfaces. (p. 35)

**7)**

- Hygroscopic materials are materials that easily absorb and hold onto water vapor from the air.
- Vapor barriers are materials that are either waterproof or have a permeance of 1 perm or less. (p. 31)

**8)**

Permeance is the measure of water vapor flow through a material. (p. 31)

**9)**

Psychrometry is the study of the air, humidity and temperature, and their affect on various materials. (p. 21)

**10)**

Relative humidity (Rh) is the amount of moisture the air currently is holding at a given temperature, but the temperature has a huge effect on the amount of moisture air can hold, so relative humidity is not always a good gauge of how much moisture is in the air. Specific humidity is the actual amount of moisture in the air, regardless of temperature. Specific humidity counts the actual grains of moisture in each pound of air. (p. 23-26)

# DRYING THEORY REVIEW QUESTIONS

**1)**

Category 1 water damages are caused by clean water. Clean water is treated water that does not contain waste products and that has not been used. Pad can be saved in some cases and carpet can be saved in many cases.

Category 3 water damages are caused by unsanitary water. Carpet and others porous materials must be replaced when contaminated with black water. (p.41 and 42)

**2)**

- Wood: Warping, buckling, cupping, and crowning.
- Carpet: Backing separation (delamination) and latex deterioration.
- Flooring: Painted concrete may flake or blister. Concrete floors are porous, so water may wick up leaving chalk-like calcium deposits on the surface.

  The whitening in the resilient tile is often caused by the separation of sealer wax or finish from the floor itself.

  The water will penetrate the grouting in the ceramic tile, causing warping or expansion of the subfloor.
- Insulation: Moisture lessens the insulation power of insulation. (p. 43-51)

**3)**

- Amount of water to be evaporated: Remove as much water as possible. Controlled by physical extraction and dehumidification.
- Humidity: Keep the relative humidity between 30% and 60%. Controlled by dehumidification.
- Air Movement: Move wet air away from the surfaces. Controlled by air movers.
- Temperature: Keep the temperature between 70° and 90°. Controlled by heaters if necessary. (p. 53 and 54)

**4)**

Specific and relative humidity readings from a dry unaffected area of the structure.

Moisture Content readings from dry unaffected contents and structure. (p. 55)

**5)**

An open system works only when measurements for outside air are at least 20 gpp less than measurements for inside air. For the most effective drying conditions, outside air should offer high temperature and low relative humidity. (p. 57)

**6)**

- **Air movers:** The best way to calculate air mover requirements is to use one air mover for each 100 to 300 square feet of damaged area.
- **Dehumidifiers:** Calculate the total cubic feet of air in the structure or in the affected area. Remember Length x Width x Height.

  Determine the amount of air to dehumidify per hour by multiplying the cubic foot measurement by the class level. (For example, for a Class 3 damage, multiply the total cubic feet of the structure by 3.)

  Determine the capacity of the dehumidifiers you are using by looking in the user manual. This measurement will be given in cubic feet per minute (CFM).

  Multiply the CFM by 60 minutes to discover the Cubic Feet per Hour dehumidifier capacity.

  Compare the amount of air requiring dehumidification with the calculated capacity of your dehumidifier. The capacity of the dehumidifier must be higher than the total cubic feet required to dehumidify the area in order for drying to occur. You must use AT LEAST this amount of dehumidifiers.

| | ***Conventional Refrigerant*** | ***Low Grain Refrigerant (LGR)*** | ***Desiccant*** |
|---|---|---|---|
| | $Ft^3$ / $ft^3$ per pint | $Ft^3$ / $ft^3$ per pint | AEH x $Ft^3$ / 60 |
| | Pints needed | Pints needed | CFM needed |
| ***Class 1*** | 100 $ft^3$ per pint | 100 $ft^3$ per pint | 1 AEH |
| ***Class 2*** | 40 $ft^3$ per pint | 50 $ft^3$ per pint | 2 AEH |
| ***Class 3*** | 30 $ft^3$ per pint | 40 $ft^3$ per pint | 3 AEH |
| ***Class 4*** | N/A | 50 $ft^3$ per pint | 2 AEH |

- Air movers should be positioned at 45° angle, in a clockwise pattern, with the inlet towards the wall.
- Air movers should also not blow air directly into the back of the dehumidifier. Aim the air produced by a dehumidifier toward an air mover, and direct the hot air in the desired direction. (p. 63-67)

**7)**

Place an air mover under the carpet to improve the drying of carpets. Always vent the carpet so air can escape. Tack carpet on tackless strip so it will not become loose when floating. Do not run air mover at too high of a speed. If carpet is floated too much, it may stretch. (p. 61)

**8)**

Ventilate de wall cavity. (p. 51)

**9)**

Class is determined by how many porous items are wet, and category is determined by the source of the water. (p. 41 and 65)

**10)**

Physical extraction is 1200 times more effective than dehumidification. (p. 53)

# MICROBES REVIEW QUESTIONS

**1)**

- Young children.
- Immune suppressed or comprised persons.
    1. Elderly.
    2. Persons recovering from illnesses, hospital stays and surgeries.
    3. Cancer patients.
    4. Transplant recipients.
    5. Persons with HIV.
- Asthma patients. (p. 74)

**2)**

- Category 1—Clean Water: A building damaged by clean water is the least contaminated type of water damage. By definition, clean water is "clean". It likely poses no substantial risk to human health.
- Category 2—Gray Water: Gray water contains some contamination that threatens human health.
- Category 3—Black Water: Black water is the most contaminated type of water damage and is the most threatening to human health. (p. 75)

**3)**

People may get sick when microbes grow and multiply to abnormal levels in an indoor environment. Some microbes may make you sick when they enter your body. They enter your body by:

- Breathing.
- Swallowing.
- Absorbing through the skin. (p. 74)

**4)**

Personal protective equipment will help block microbes from reaching your body. Wear respirators, gloves, goggles, and appropriate clothing to prevent infection. (p. 74)

**5)**

Molds can germinate in a warm, moist environment where a food source is present. (p. 73)

**6)**

The conditions that encourage mold growth are:

- Food source. Molds feed on organic materials in a structure.
- Temperature. The common molds found in buildings generally grow best in typical building temperatures between 68° and 86° F.
- Moisture. Most molds need lots of moisture, but some molds can survive in relative humidities as low as 65%. (p. 73)

**7)**

To prevent mold growth you must respond quickly and reduce humidity below 60%. (p. 73)

**8)**

- Respirators.
- Goggles
- Rubber gloves.
- Rubber boots.
- Full body protective suit. (p. 74)

**9)**

- Examples of Clean Water:
    - Tap water
    - Rain water
- Examples of Gray Water:
    - Urine.
    - Wash water.
    - Chemicals.

- Examples of Black Water:
    - Feces.
    - Flood water.
    - Chemicals.
    - Medical waste.
    - Dead animals. (p.75)

# EQUIPMENT AND PROFESSIONAL PRODUCTS REVIEW QUESTIONS

**1)**

Moisture sensor only detect the presence of moisture, they don't measure the amount of moisture. On the other hand, moistures testers (or moisture meters) are used to find the actual moisture content of various materials and help the technicians determine if a structure is dry. (p. 81)

**2)**

Have the same technician take the readings with the same equipment in the same places to get to get reliable numbers. (p. 82)

**3)**

Refrigerant dehumidifiers are efficient enough to lower the relative humidity in a structure to approximately 40 gpp. Desiccant dehumidifiers can lower relative humidity to a much lower point, but you risk damaging materials by getting them too dry. (p. 87)

**4)**

The term biocide is used generally to refer to any chemical agent that affects the growth of microbes like bacteria and fungi. (p. 97)

**5)**

A carpet clamp. (p. 85)

**6)**

- Apply the first treatment before work begins to make the job site safer for workers to perform their cleaning tasks. This will start to decontaminate the sewage-covered materials and surfaces, but will not completely disinfect the environment.
- Apply a second treatment after cleaning contaminated surfaces because biocides are most effective when they contact microorganisms on clean surfaces. (p. 96)

**7)**

A low grain refrigerant (LGR) is the most energy efficient dehumidifier. (p. 89)

**8)**

- Sanitize: A product listed as a sanitizer reduces microbes to levels considered by public health authorities to be safe. Under the right conditions, however, the microbes may grow back.
- Sterilize: A sterilant destroys all microorganisms, including bacteria and fungi spores. Sterilizing microbes in a water damage is generally not possible.
- Disinfect: Disinfectants and germicides are antimicrobials that destroy about 99% of organisms they contact on surfaces. (p. 97)

**9)**

A wand. (p. 84)

**10)**

- Phenolics.
- Quaternary Compounds.
- Gluteraldehydes.
- Chlorine. (p. 98)

# JOB MANAGEMENT REVIEW QUESTIONS

**1)**

SERVPRO® (28501) *Customer Information Form—Water Damage*. (p. 109)

**2)**

SERVPRO® (28000) *Authorization to Perform Services.* (p. 111)

**3)**

| | |
|---|---|
| Within 1 Hour | Contact the customer. |
| Within 4 Hours | Begin the work. |
| Within 8 Business Hours | Provide preliminary scope information and initial ScanER® estimate update to the insurance adjuster. (p. 104) |

**4)**

- To know what portions of the structure and contents will dry and clean to a preloss conditions
- To know what portion of the structure and contents will not dry to a preloss condition.
- To know what portion of the structure and contents are unaffected.
- To know what portion of structure and contents we are not sure about. (p. 115)

**5)**

SERVPRO® (28509) *Customer Equipment Responsibility Form.* (p. 113)

**6)**

When the job has been completed, you should walk through the job by yourself to make sure everything is truly finished. Then, walk through with the customer to ensure everything is done to the customer's satisfaction. (p. 119)

**7)**

A moment of truth occurs every time a SERVPRO Franchise employee comes into contact with a customer or an insurance contact. What the employee says is judged; how the employee looks is judged; and how the employee acts is judged. (p. 108)

**8)**

"Don't commit the adjuster" means to do not promise that the adjuster will replace some things because the adjuster might not agree with that decision. (p. 108)

**9)**

SERVPRO® (28503) *Certificate of Satisfaction.* (p. 120)

**10)**

Points #2—Authorization, Insurance Verification and Deductible.

Point #5—How We Proceed.

Pont #7—Pre-existing or Preloss Conditions.

Point #8—Personal Items.

Point #13—Health and Safety.

Points #14—Approximate Completion. (p. 109 and 10)

# EMERGENCY SERVICES REVIEW QUESTIONS

**1)**

1. What areas and materials are wet?
2. How wet are the materials?
3. Is the drying process working?
4. Are materials dry before ending the drying process? (p. 126)

**2)**

Figure out where the water is coming from. Make sure the water has been stopped or contained. If it is not, contact your supervisor or the adjuster. (p. 127)

**3)**

Use moisture detection equipment to determine where is it wet. Start at the source of the water and work outwards. Make sure you test the walls, baseboards, insulation, cabinets, hidden areas, crawl spaces, registers, ducts, carpets, pads, subfloors, wet contents, etc. (p. 127)

**4)**

When there is less than 1 inch of standing water.

**5)**

As you enter in the affected areas. (p. 131)

**6)**

- Take care of any dangerous situations, post warning signs and make sure occupants are protected. Never proceed until you are sure it is safe.

- Extract the water.
- Look for pre-exiting damages. The primary pre-existing conditions to look for are delamination and mold growth.
- Removing the carpet and the pad.
- Place dehumidifiers to remove excess moisture from the air.
- Set up air movers around the perimeter of the room at 45° angles pointing towards the wall.
- Check temperature and relative humidity in the affected area, inside an unaffected area, outside, and the air coming out of each dehumidifier.
- Take moisture content readings of wet materials.
- Take moisture content readings of dry materials in unaffected areas. These are the drying goals.
- Complete a SERVPRO® (28509) Customer Equipment Responsibility Form.
- Explain the customer why it is important to leave the equipment on. (p. 129 -130)

**7)**

Sewage is considered infectious water. If damage is from black water, both carpet and pad should be removed and disposed using special disposal procedures.

An EPA registered disinfectant should be sprayed on affected areas.

It is important to evaluate whether contents and structure can be decontaminated and restored or must be removed and replaced. (p. 130 -131)

**8)**

The best chance to remove furniture stains is while the carpet is still wet. Also the furniture should be blocked at this time. (p. 129)

**9)**

To pull the pad:

- Disengage the carpet with a carpet awl and knee kicker.
- Cut as few seams as possible.
- Pull back the carpet and extract the water from the pad.
- Don't fold carpet at the seam or step on folded carpet (it creases).
- Don't damage walls or baseboards with the carpet.
- Use a utility knife to cut pad into 2x2 foot sections.
- Place into plastic bags.
- Save at least a one square foot section so you'll know what type of pad to use when replacing padding.
- Remove the pad from structure. Be careful not to drip in unaffected areas.

To float the carpet:

- Stick the nose end (exhaust port) of an air mover under a corner and secure to the air mover with the clip.
- Make sure to fold back a triangular section of the carpet in the opposite corner to prevent carpet stretching.
- Turn on the fan and adjust until carpet rises 3 to 4 inches and air flows freely out the opposite corner. (p. 129-130)

**10)**

- Customer Information Form
- SERVPRO® Understand the Trauma of Disaster brochure.
- Authorization to Perform Services.
- Water Damage Emergency Services Report.
- SERVPRO® (28509) Customer Equipment Responsibility Form. (p. 127-130)

# JOB MONITORING REVIEW QUESTIONS

**1)**

Thermohygrometer. (p. 137)

**2)**

When the affected area readings are the same or drier than the unaffected areas, you know that the affected area is back to normal. (p. 137)

**3)**

A drying goal should be established for the affected areas of the structure by measuring unaffected areas. Determine the moisture content of materials in unaffected areas of the structure and make these readings your drying goals for the affected areas. (p. 137)

**4)**

The drying process is working; the Specific Humidity in grains per pound is lessening after 24 hours. The Specific Humidity for Day 1 is 92 gpp and 86 gpp for Day 2.

**5)**

- To be sure the structure is drying.
- To make sure our equipment is working properly and safely.
- To continue to communicate with the customer.
- To document that our processes are working in order to avoid future problems or liabilities.
- Proper monitoring and documentation may be one's best defense in a lawsuit. (p. 135)

**6)**

The grain depression is -9 and it is not enough, the drying process is not working because the air is wetter.

**7)**

The Specific Humidity in the affected area (68 gpp) is less that outside (81 gpp), so there would not be a benefit to using an open air drying system. Use an open drying system only when measurements for outside air are at 20 gpp less than measurements for inside air.

**8)**

SERVPRO® (28540) Authorization to Remove Dehumidification /Drying Equipment. (p. 140)

**9)**

Both in and out the affected areas and outside of the structure. Also in the air coming out of the dehumidifier(s). (p. 140)

**10)**

Regularly (Daily). (p. 139)

# RESTORATION SERVICES REVIEW QUESTIONS

**1)**

Once the structure and contents are dry, the technician can perform the restoration services. (p. 143)

**2)**

Once the structure is dry, remove air movers, dehumidifiers and other drying equipment from the structure. (p. 145)

**3)**

- *Mitigation:* Stopping any further damage from happening. Can include stopping and removing water and placing drying equipment.
- *Restoration:* The process of getting a structure back to the way it was before the water damage occurred. (p. 9 and 143)

**4)**

Restoration may include:

- Cleaning, repairing or reinstalling floors and floor coverings, such as carpets, carpets pads, hardwood floor, resilient and nonresilient floors.
- Removing and resetting contents to install or repair floor coverings.
- Cleaning or repairing subfloors.
- Cleaning, deodorizing or replacing window coverings, including blinds and draperies.
- Cleaning and deodorizing contents. (p. 144)

**5)**

During the restoration the customer must sign the following forms:

- SERVPRO® (282509) Customer Equipment Responsibility Form.
- Certificate of Satisfaction. (p. 145 and 150)

**6)**

You will be able to replace it with like kind and quality. (p. 147)

**7)**

- Lay out pad using tackless for straight edge. The pad should be installed at right angles to carpet seams.
- Cut pad to fit largest areas first.
- Use a sharp blade to cut pad. Be careful with sharp knives to prevent injury.
- Lay pad with slick side facing up so carpet can slide over it.
- Tape seams of pad.
- Anchor pad to floor with double-sided, nonpaper tape, staples or glue. (p. 147)

**8)**

- Prepare floor for carpet reinstallation.
- Reinstall tackless trip, if necessary.
- Install new pad.
- Prepare the carpet for stretching.
- Stretch and attach the carpet. (p. 147 and 148)

**9)**

You should clean the entire carpet. (p. 149)

**10)**

You should defer this type of question to the adjuster. (p. 143)

# SPECIALTY DRYING SITUATIONS REVIEW QUESTIONS

**1)**

- If the carpet has been exposed to water for less than 72 hours.
- If there is no evidence of mold growth or other biological contamination.
- If carpet is not installed over hardwood floors or laminated floor.
- If there is no any evidence or structural damage to the sub-flooring.
- If it is a clean water damage.
- If there are not multiple layers of sub-flooring, or if there is not a vapor barrier.
- If the pad doesn't have a nonporous layer that will trap water underneath. (p. 155)

**2)**

It is important to have a vapor barrier because prevents moisture vapor from transferring from the soil into the air making the crawl space more damp. (p. 158)

**3)**

When equipment won't fit, one option is to use flex hose as a duct to move air from the dehumidifiers to crawl space. A piece of light gauge sheet metal can be cut to fit the outlet of the dehumidifier to vent dry air into small areas. (p. 158)

**4)**

If the cabinet does not have a back, you may be able to drill holes in the wall to allow air circulation in the wall cavity just as you would to dry a typical wall.

If the cabinet has a back, drying times are extended because air movement is limited. You can still drill holes in the cabinet back and patch with a material comparable to the back of the cabinet.

When cabinets are hung on an interior wall, cut holes in the wall from the room on the opposite side of the wall. (p.159)

**5)**

Because vinyl prevents moisture transfer, dehumidifiers cannot remove moisture effectively from the wall in many cases. The most effective way to dry walls covered with vinyl is to remove the vinyl wall covering. Always communicate first with the adjuster and the customer. Also, it may be effective and more economical to remove the base molding, drill holes, and force air into the wall cavity without damaging the wallpaper. (p. 160)

**6)**

The effect of water on the floor is determined by the amount of water and on how long water was on the floor. Buckling, cupping and warping are natural in wood exposed to moisture.(p. 161)

**7)**

Select the most appropriate drying method. (p. 165)

**8)**

- Document Drying.
- Electronic Restoration
- Electronic Media Cleaning and Reparation. (p. 165 and 166)

**9)**

Drying exterior walls can be difficult because insulation in wall cavities greatly reduces the air circulation. (p. 164)

**10)**

- Extract the carpet more times and increase the number of air movers and dehumidifiers.
- The extraction step of the in-place drying system must be aggressive. It is necessary to use specialty (weighted) equipment that squeeze water out the carpet and pad.
- Extracting with in-place method requires double or triple the time to extract. Spend approximately 1 hour per 300 square feet. (p. 155 and 156)

**11)**

- Ensure no electrical hazards exist. Unplug all electronics.
- Disconnect any backup batteries and remove fuses or trip breakers.
- Remove electronics from the exposed environment, or at least cover electrical equipment with plastic from the exposed environment. (p. 166)

# DEODORIZATION REVIEW QUESTIONS

**1)**

Sanitary level of cleaning, soils, and contaminates are removed to the point that general health is protected. (p. 175)

**2)**

- Pump-Up Sprayer: #155 Mildew Odor Treatment.
- Thermal Fogger: #338 Neutral Fog Deodorizer, High Volume.
- ULV: #302 Smoke Deodorizer.

**3)**

The first step to get rid of an odor is to remover what causes the odor. (p. 171)

**4)**

Masking agents cover bad odors with a pleasing smell, on the other hand, pairing agents are products that combine with odor particles causing them to fall onto surfaces to be cleaned up. (p. 172)

**5)**

- Respirator and chemical resistant gloves must be worn specially when applying disinfectants.
- All people must be out of the area being fogged.
- Eye protection and protective clothing are important.
- Some chemicals used in deodorization cannot be disposed of in sewage lines. They must be disposal according to state or local guidelines.
- Activated oxygen (ozone) should not be used in damp environments. Ozone will react with moisture and may cause a bleaching action. Activated oxygen also reacts with rubber.
- Deodorization agents used for thermal fogging are solvent based and flammable. (p. 173)

**6)**

A box fan has a high velocity exhaust fan to ventilate structures, both before and after deodorization. Box fans with high velocity exhaust fans ventilate buildings faster than air movers; also box fans shorten the time needed before allowing occupants to return after deodorization. (p. 174)

**7)**

Receptors in the nose send a message to the brain that determines whether the smell is good or bad. This determination is made based on past experience, as well as on the actual odor. The interpretation differs with each individual. (p. 169)

**8)**

The first step to get rid of an odor is to remove what causes the odor. If you smell something, you should look for the source of the odor. (p. 171)

**9)** HEPA filters capture 99.97% of particles down to 0.3 microns. (p.174)

# DEALING WITH MOLD REVIEW QUESTIONS

**1)**

To grow and multiply, molds require the right temperature and food sourced. Most molds grow best between 68° and 86° F. Molds feed on organic materials, and many materials in houses can be used as food. (p. 181)

**2)**

To ensure mold doesn't spread to uncontaminated areas and to protect occupants. (p. 185)

**3)**

Medical experts say an exposure to some molds may produce upset stomach, nausea, vomiting and diarrhea. More serious effects are dermatitis (inflammation of the skin)and internal bleeding. (p. 182)

**4)**

1. Contain the mold contamination.
2. Remove mold contamination.
3. Dry the structure and contents to stop further mold growth (p. 185 and 186).

**5)**

Contact your supervisor and follow the procedures set by the insurance company. Immediately proceed with their guidance. (p. 184)

**6)**

- Mycotoxins.
- Microbial Volatile Organic Compounds (mVOCs). (p.182)